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THESIS

JIEDDO TEST BOARD (JTB) OPERATIONAL INTERACTIONS AND END-USER ANALYSIS OF THE INFORMATION FLOW PROCESS

by

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June 2011

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13. ABSTRACT (maximum 200 words)

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JIEDDO TEST BOARD (JTB) OPERATIONAL INTERACTIONS AND END-USER ANALYSIS OF THE INFORMATION FLOW PROCESS

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LIST OF ACRONYMS AND ABBREVIATIONS

ATEC	Army Test and Evaluation Center
China Lake	Naval Air Weapons Station China Lake
CIED	Counter Improvised Explosive Device
CIO	Chief Information Officer
CTEWCC	Combined Theater Electronic Warfare Command Center
CTO	Chief Technology Officer
DoD	Department of Defense
DoDAF	Department of Defense Architecture Framework
EWO	Electronic Warfare Officer
FOA	Forward Operating and Assessment
IED	Improvised Explosive Device
JIEDDO	Joint Improvised Explosive Device Defeat Organization
JTB	Joint Improvised Explosive Device Defeat Test Board
KING	Knowledge Information Network Group
KM	Knowledge Management
M&S	Modeling and Simulation
OV	Operational Viewpoint
POC	Point Of Contact
RFI	Request for Information
SME	Subject Matter Expert
SV	System Viewpoint
TSWT	Theater Support Web Tool
VTC	Video Teleconference
WSMR	White Sands Missile Range
YPG	Yuma Proving Grounds

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I. INTRODUCTION

A. BACKGROUND

This research was conducted to provide a Joint organization within the Department of Defense, a snapshot of its process from the perspective of the end users. It is intended to be a representation of the support and products provided, and how the support and products are utilized by the end users.

1. The Threat

Improvised Explosive Devices (IEDs) continue to harass, maim, and kill innocent men, women, and children, as well as U.S. and Coalition forces in Iraq and Afghanistan. Currently over 60% of U.S. casualties are caused by IEDs (*Military Casualty Information, 2011*). The urgency of this task cannot be overemphasized. IEDs have been, and continue to be a steady threat to U.S. personnel, while the War on Terror continues. U.S. casualties related to IEDs have consistently increased since the beginning of the War on Terror, from 12 in 2001 to 499 in 2010 (*Military Casualty Information, 2011*). As of 2010, 1446 U.S. service members and 2281 total U.S. and Coalition service members have been killed as a result of IEDs (*Military Casualty Information, 2011*).

2. The Response

The U.S. Government has employed significant resources across a diverse range of dedicated researchers, developers, and testers to create tools to combat the terror of IEDs and counter the IED threat. One response to the IED threat by the U.S. Government was to create an organization tasked with countering the IED threat. The Secretary of Defense signed DoD Directive 2000.19E, which directed the development of the Joint Improvised Explosive Device Defeat Organization (JIEDDO), a joint organization designed to combat the IED threat (U.S. Department of Defense, 2006). The Directive which created JIEDDO, states that JIEDDO shall focus (lead, advocate, and coordinate)

all Department of Defense actions in support of the Combatant Commanders' and their respective Joint Task Forces' efforts to defeat Improvised Explosive Devices as weapons of strategic influence. Under this directive, JIEDDO has developed its creed: "Attack the Network; Defeat the Device; Train the Force (from U.S. Department of Defense, 2011)."

3. The Organization

DoD Directive 2000.19E gives JIEDDO the authority to form functional boards that perform specific roles to assist JIEDDO in accomplishing its mission. In total the Directive assigns duties and responsibilities to seven separate boards, groups and teams. One such board is the Joint Improvised Explosive Device Defeat Organization Test Board (JTB) and will be the focus of this research. This DoD Directive gives the JTB the authority to synchronize all testing and evaluation events which fall under JIEDDO influence and to coordinate with military departments to quell the possibility of redundant testing, under five specific areas of authority, consisting of:

- Track and identify all JIEDDO test events.
- The use of testing sites and laboratories in order to collaborate, thus decreasing redundancy of testing
- Scheduling authority for testing events
- Coordination and reporting of new technology assessments to the Combatant Commanders
- Provide recommendations to the JIEDDO Integrated Program Team (U.S. Department of Defense, 2006, p. 16, 17)

Adhering to these five areas of authority, the JTB conducts its operations as a multiple organization enterprise.

4. The Enterprise

The JTB is global in nature as are the associated organizations, personnel, and processes. The JTB does not have direct authority over the organizations it is associated with yet it is dependent upon those organizations in order to perform its mission. It is due to this, that the JTB has become an enterprise, and will be called as such, the JTB

Enterprise, throughout this thesis. In the context of this thesis, the term JTB will be used to describe the personnel assigned to roles that provide direct support to the JTB Director. These personnel support the Director by providing guidance and oversight to the areas of authority set forth for the JTB by the Directive. The JTB bridges the gap between the deployed elements of the JTB Enterprise and the test sites. There are other areas of the JTB Enterprise, which provide the JTB Director information as well. For example, the JTB employs the use of working groups who perform specific tasking that gives the Director information, and that can then be used to develop testing protocols ensuring the most effective tests are conducted.

The end user, in the context of this research, is defined as a person or organization that interacts (directly or indirectly) with the JTB. The end user consists of personnel deployed to areas where the threat of an IED is heightened. End users are not restricted solely to the troops in harm's way; end users can also be the organizations who provide support to the end user.

Theater support elements are organizations that provide both the end user and the JTB with information, which will assist in the counter IED fight. The theater support elements are a vital portion of the JTB as these organizations provide access for the JTB to the end user as well as a means for the end user to reach out to the JTB. There are also times when these organizations will act as the end user and in those cases the terms, theater support elements, and end users, can be interchanged.

The test sites are organizations associated with the JTB Enterprise and consist of open--air test centers, laboratories, academic institutions, and modeling and simulation laboratories. In some cases, various test sites are used simultaneously for the JTB to execute its tasking; therefore, the term test site may refer to one or more of the testing organizations.

B. THE JOINT IMPROVISED EXPLOSIVE DEVICE TEST BOARD

In working diligently to test the separate components of an IED defeat system, the perception is that opportunities may be missed to coordinate, collaborate, and cooperate. Exploiting these opportunities could increase the effectiveness of the information available across the JTB Enterprise. If an appropriate collaboration process and tool set were available, it is hypothesized that the test centers and supporting research organizations would be able to provide better support to the end users. This process improvement could increase understanding of the capabilities and limitations for the various IED defeat products, and lead to more effective IED mitigation at Forward Operating Bases. It is theorized that an analysis of the JTB Enterprise and its processes from the perspective of the end user, will result in better support to the end user. The objective is to research the manner of interaction the JTB currently has with the end user, and upon uncovering this interaction it is believed the JTB will have a better understanding how its products are used. This knowledge could then be used by the JTB to evaluate its processes, thus improving the support needed by the end user.

While the JTB enterprise is involved with several different types of test and associated processes, there is one JTB process that is prevalent. The Request for Information (RFI) process is the most common one employed by the JTB and is at the heart of all JTB activities. This research focuses on the RFI process.

C. APPROACH TO RESEARCH

Determining how the end user uses the products and processes of the JTB Enterprise requires an analytical approach. It is believed that an analysis of the JTB, to include its organizational structure, processes, and information flow, would yield results applicable to both the JTB and the end user. The most efficient way to meet the research objectives was by examining the JTB as an Enterprise. The analysis was conducted by a three step process. The first step was to attain an overall perspective of the JTBs through interviews and academic research. The second step was to structure the information gathered by the interviews in accordance with the Department of Defense Architecture

Framework (DoDAF) using a software tool with the capabilities for modeling and simulation. The third step was to analyze this structure through the modeling and simulation capabilities of the software tool.

The interviews were conducted onsite with various participants within the JTB, as well as Subject Matter Experts (SMEs) throughout the JTB Enterprise. The information that was gathered through the interview process was critical to complete the analysis and resulted in various recommendations to the JTB. The key findings and recommendations are given in the hopes of giving the JTB the capability to provide better support to the end user.

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II. LITERATURE REVIEW

The objective of this research is to provide an end-user perspective of the JTB information flow process. The method used to accomplish this objective was to display the JTB as an enterprise in accordance with the Department of Defense Architecture Framework (DoDAF). This chapter provides a review of information sharing, knowledge management, enterprise architecture, and DoDAF.

A. INFORMATION SHARING

One of the focal points of this research was to determine how information is shared throughout the JTB Enterprise. To provide clarity, a distinction between information and knowledge is needed. Information and knowledge are two terms that are often used interchangeably; however, information is separate from knowledge, as information is data that is given context, and knowledge is information that is given meaning; thus information is the heart of knowledge. Information flow can be aided or impeded through the use of tools such as the strategy implemented to facilitate information sharing, the organizational structure and/or the technical infrastructure. The research in this thesis will cover the strategy and organizational structure while the technical infrastructure will be examined by a complimentary thesis.

1. Strategy

The Department of Defense instituted an Information Strategy in 2007 in response to a recommendation from the Quadrennial Review Board of 2006 (U.S. Department of Defense, 2007, p. 2). The goal of the strategy is to create an environment within the DoD that will promote sharing, achieve an extended enterprise, strengthen agility, and instill trust among DoD organizations (U.S. Department of Defense, 2007, p. 5).

2. Organizational Structures

The structure of an organization can dictate how the information flows through the organization. There are five components to an organization: the strategic apex (top management), the middle line (intermediate managers), the operating core (operators of the organization), the technostructure staff (analysts and system designers), and the support staff (providers of indirect services to the organization) (Mintzberg, 1981, p. 3). Organizations can be structured in five different configurations: a simple structure, a machine bureaucracy, a professional bureaucracy, a divisionalized form, and an adhocracy (Mintzberg, 1981, p. 4). The machine bureaucracy emphasizes the standardization of work for coordination resulting in low skilled yet specialized jobs (Mintzberg, 1981, p. 7). The divisionalized form is a group of independent organizations loosely joined which is characterized by an incomplete structure (Mintzberg, 1981, p. 8). The simple structure, machine bureaucracy, and professional bureaucracy are defined later in this section. The focus of this research is on the operating core and the technostructure components and the simple structure, professional bureaucracy, and the adhocracy as the two components and the three configurations which most closely relate to the JTB.

A simple structure is composed of one large unit with minimal top level managers who have oversight of a group of operators who perform the functions of the organization (Mintzberg, 1981, p. 5). Key characteristics of a simple structure organization include flexibility and highly centralized control. Being a flexible organization allows the organization to adapt to a dynamic environment in which the organization may be operating; however this can lead to little formalization and little training. The centralized control means that all information that flows through the organization flows through the strategic apex of the organization (Mintzberg, 1981, p. 5).

A professional bureaucracy is a configuration arranged by the standardization of skills vice the processes, therefore most of the control is given to the personnel who perform the tasks, however, the standardization of the skills provides for little flexibility

(Mintzberg, 1981, p. 8). The professional bureaucracy relies heavily on its operating core which consists of highly-specialized personnel who require a great deal of training and indoctrination. This type of configuration operates well in a complex but stable environment where personnel require little formalization and coordination as the personnel are able to work autonomously (Mintzberg, 1981, p. 8).

An adhocracy is a configuration that is complex and non-standardized yet fluid. Similar to the professional bureaucracy, the adhocracy relies heavily upon specialized personnel to perform its duties; however, in this case the specialized personnel communicate across domains via the use of integration rules set forth by the organization (Mintzberg, 1981, p. 10). It can be defined as adaptable to dynamic situations due to the informal nature of communications between the operators of the organization. This creates an environment where the specialized personnel must work together in order to accomplish tasks as the power of an adhocracy is dispersed throughout the organization (Mintzberg, 1981, p. 10).

3. Collaborative Environments and Organizations

Information sharing in organizations is typically conducted in a collaborative environment. Collaboration is the efficient and effective manner in which organizations work together internally and externally and is practiced at all levels of an organization (Beyerlein, 2003, p. 13). A collaborative organization is designed to allow information to flow easily throughout the organization. Benefits of a collaborative environment include empowered personnel, as they do not require direct supervision, improved processes, as personnel take it upon themselves to solve problems, and better support to the end user, as personnel and end users collaborate which maximizes support (Beyerlein, 2003, p. 25).

Collaborative organizations are built upon the ten principles listed in Table 1.

Table 1. Principles of Collaborative Organizations (From Beyerlein, 2003, p. 34)

Focus collaboration on achieving business results
Align organizational support systems to promote ownership
Articulate and enforce “a few strict rules”
Exploit the rhythm of convergence and divergence
Manage complex tradeoffs on a timely basis
Create higher standards for discussions, dialogue, and information sharing
Foster personal accountability
Align authority, information, and decision making
Treat collaboration as a disciplined process
Design and promote flexible organizations

Three of the principles listed in Table 1 will be elaborated upon in order to keep within the scope of this research. The third principle, articulate and enforce “a few strict rules,” involves developing governance for the organization thus providing direction and guidance to members of the organization. The “few strict rules” should not constrain or inhibit personnel in performance of their duties. The rules should be a set of parameters which would provide personnel enough freedom to accomplish tasking, yet structured to align with the strategic goals of the organization (Beyerlein, 2003, p. 39). The sixth principle, create higher standards for discussion, dialogue, and information sharing, gives the organization the ability to discuss and consider alternatives to increasingly complex problems. Solving complex problems in an unpredictable environment is possible in a collaborative organization since the information needed to make decisions is both available and accessible (Beyerlein, 2003, p. 43). The ninth principle, treat collaboration as a disciplined process, promotes the ability to continually monitor and improve the process. This increases the likelihood that all stakeholders involved in the process have

common information. Therefore, the decisions made based on the common information are more apt to be trusted at all levels of an organization since the decision is the result of a collaborative effort (Beyerlein, 2003, p. 49).

B. ENTERPRISE ARCHITECTURE

An enterprise is a group of associated organizations and/or activities that includes the people, information, and technology that provide a service to a customer or end user. Enterprises are structured in different ways that depend upon the number of organizations, people, and processes involved which are needed to allow the enterprise to function. The structure of an enterprise is its architecture and within this architecture are the guiding principles upon which the organization was founded (Minoli, 2008, p. 54). The principles may or may not be apparent by the architecture of the enterprise. Principles that are not explicitly stated in the architecture would have been used to develop the framework. The framework is the tool used to describe the enterprise's architecture. There are many accepted frameworks in use around the world; this thesis will use the DoD Architecture Framework (DoDAF).

An enterprise architecture framework is a means to represent all aspects of the enterprise. To accurately describe the enterprise the framework must have an overarching set of standards or a strategy to govern the interactions associated with the enterprise (Minoli, 2008, p. 70). The governance of the enterprise should be generated and enforced by a Chief Information Officer/Chief Technology Officer (CIO/CTO) and should cover the principles in Table 2, which has been legislated by the Clinger-Cohen Act (1996).

Table 2. Enterprise Architecture Principles (From Minoli, 2008, p. 64)

Architectures must be appropriately scoped, planned, and defined based on the intended use
Architectures must be compliant with the law as expressed in legislative mandates, executive orders, federal regulations, and other federal guidelines.
Architectures should facilitate change
Architectures set the interoperability standard
Architectures provide access to the information but must secure the organization against unauthorized access
Architectures must comply with the privacy act of 1974
Enterprise architectures must reflect the agency's strategic plan
Enterprise architectures coordinate technical investments and encourage the selection of proven technologies
Architectures continuously change and require transition
Architectures provide standardized business processes and common operation environments
Architecture products are only as good as the data collected from subject matter experts and domain owners.
Architectures minimize the burden of data collection, streamline data storage, and enhance data access
Target architectures should be used to control the growth of technical diversity

When developing the enterprise architecture the CIO/CTO can base the governance of the enterprise on the ideas covered in Table 3.

Table 3. Enterprise Architecture Development Considerations (From Minoli, 2008, p. 71)

Description of the purpose and value of an enterprise architecture
Description of the relationship of the enterprise architecture to the agency's strategic vision and plans
Description of the relationship of the enterprise architecture to capital planning, enterprise engineering, and program management
Translation of business strategies into enterprise architecture goals, objective, and strategies
Commitment to develop, implement, and maintain an enterprise architecture
Identification of enterprise architecture compliance as one criterion for new and ongoing investments
Overview of an enforcement policy
Security practices to include certification and accreditation

The CIO/CTO should also consider the enforcement policy questions in Table 4.

Table 4. Enterprise Architecture Policy Development Questions (From Minoli, 2008, p. 71)

How and when will projects submit project plans to be reviewed for enterprise architecture compliance?
Who will be responsible for compliance assessment or justification of waivers?
How will compliance and noncompliance be documented and reported?
How will outstanding issues of noncompliance be resolved or wavers be processed and approved?
Who will be responsible for processing, authorizing, and reassessing waivers?
What will be the content and format of waiver submissions?
If a waiver is granted, how will projects achieve compliance in the future?
What are the ramifications if a noncompliant project is not granted a waiver (e.g., funding or deployment restrictions)?

There are two complimentary views of an enterprise architecture. The first is that an enterprise architecture provides the organizing logic for processes and the information technology infrastructure that correspond to the integration and standardization requirements of the organizations operating model (Ross, 2006). The second is that an enterprise architecture is a blueprint that defines the structure and operation of an organization with the intent of determining the most effective employment of the organizations resources (Ross, 2006). Figure 1 provides an example of a way to organize an enterprise based upon the amount of integration and standardization required for the enterprise to meet its goals.

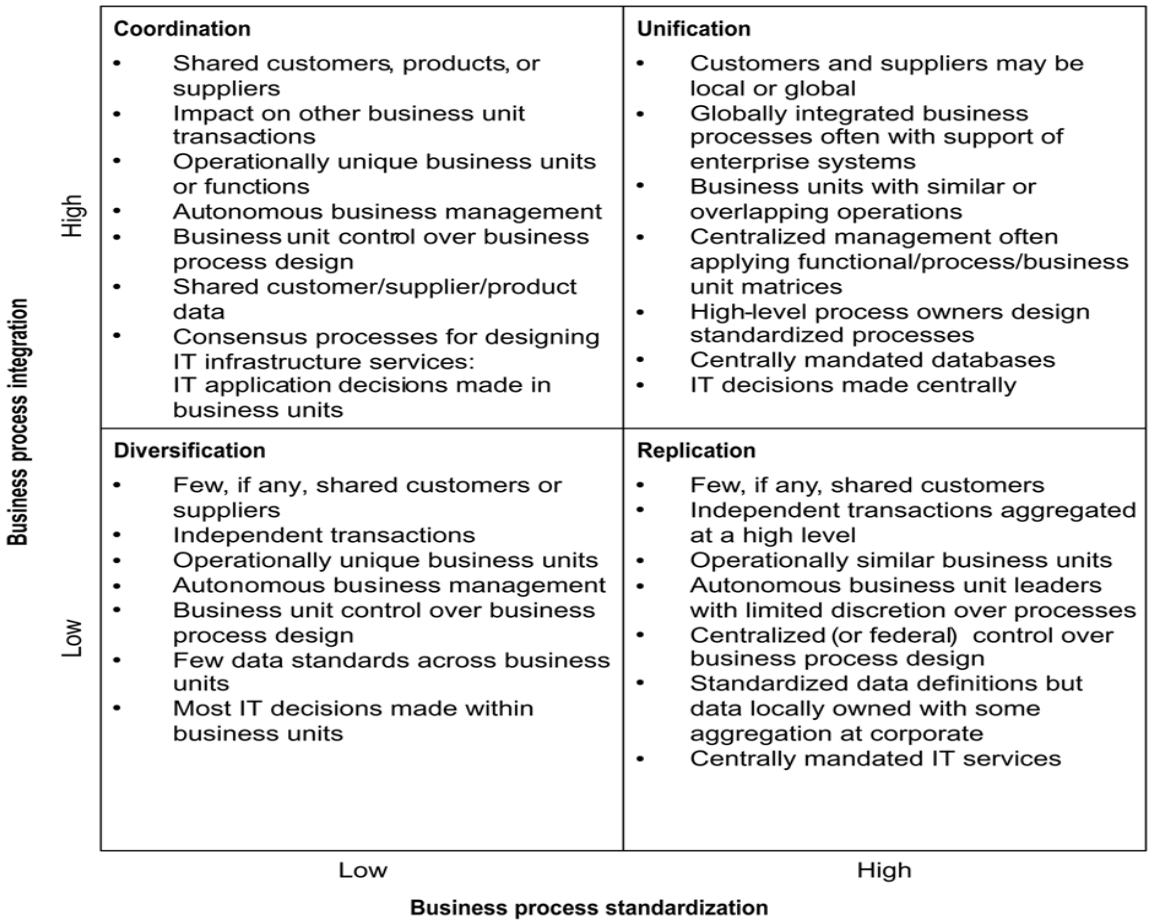

Figure 1. Business Process Integration vs. Business Process Standardization (From Ross, 2006, p. 29)

1. Department Of Defense Architecture Framework

The Department of Defense Architecture Framework (DoDAF) was developed to provide a set of architecture techniques that will assist in supporting the decision makers (U.S. Department of Defense, 2007, Vol. 1, p. 5). It is designed for all major DoD and military organizations as a means to offer structure and give a representation of how an organization interacts internally and with other organizations (U.S. Department of Defense, 2007, Vol. 1, p. 5). DoDAF employs viewpoints that cover functional areas related to the architecture of an enterprise. The eight different viewpoints available within DoDAF are described in Table 5.

Table 5. DoD Architecture Framework Viewpoint Description (From U.S. Department of Defense, 2007, Vol. 1, p. 21–22)

Viewpoint	Description
All	Contains overarching aspects of the architecture as related to all of the viewpoints
Capability	Articulates the capability requirements, the delivery timing, and the deployed capability
Data and Information	Articulates the data relationships and alignment structures in the architecture content for the capability and operational requirements, system engineering processes, and systems and services
Operational	Includes the operational scenarios, activities, and requirements that support capabilities
Project	Describes the relationships between operational and capability requirements and the various projects being implemented
Services	The design for solutions articulating the Performers, Activities, Services, and their Exchanges, providing for or supporting operational and capability functions
Standards	The design for solutions articulating the Performers, Activities, Services, and their Exchanges, providing for or supporting operational and capability functions
Systems	The design for solutions articulating the systems, their composition, interconnectivity, and context providing for or supporting operational and capability functions

Figure 2 is a visual representation of the multiple DoDAF viewpoints and the relationships between them.

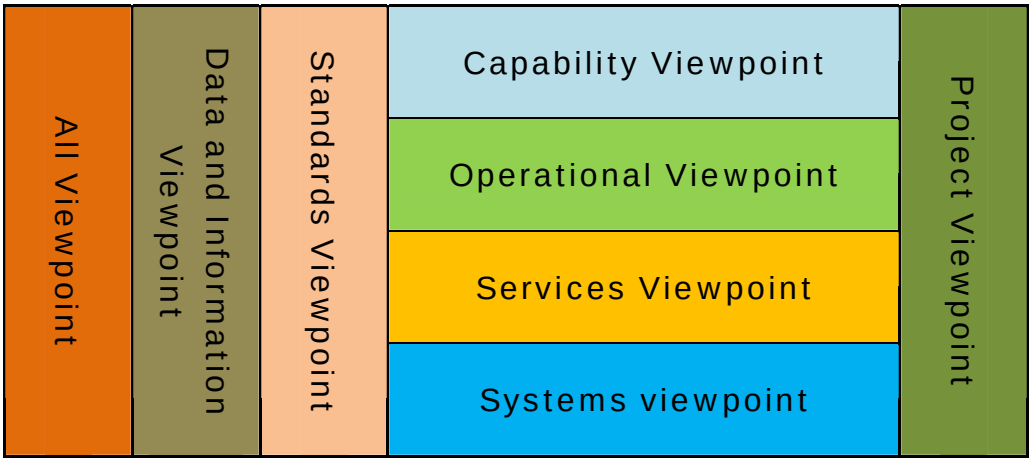

Figure 2. DoD Architecture Framework Viewpoint relationships (From U.S. Department of Defense, 2007, Vol. 2, p. 140)

As both an organization and an enterprise it is logical to structure the JTB in accordance with DoDAF, however only Operational Viewpoints and System Viewpoints were produced as part of the research for this thesis.

a. Operational Viewpoints

Operational viewpoints are used to describe a DoD organization by graphically depicting the tasks, activities, and operations performed by that organization. Developing operational viewpoints can assist the organization by linking functional requirements to the organization's activities. There are nine models associated with Operational Viewpoints as described in Table 6.

Table 6. Operational Viewpoint Models (From U.S. Department of Defense, 2007, Vol. 2, p. 162)

Model	Description
OV-1: High-Level Operational Concept Graphic	The high-level graphical/textual description of the operational concept
OV-2: Operational Resource Flow Description	A description of the Resource Flows exchanged between operational activities
OV-3: Operational Resource Flow Matrix	A description of the resources exchanged and the relevant attributes of the exchanges
OV-4: Organizational Relationships Chart	The organizational context, role or other relationships among organizations
OV-5a: Operational Activity Decomposition Tree	The capabilities and activities (operational activities) organized in a hierarchal structure
OV-5b: Operational Activity Model	The context of capabilities and activities (operational activities) and their relationships among activities, inputs, and outputs; Additional data can show cost, performers or other pertinent information
OV-6a: Operational Rules Model	One of three models used to describe activity (operational activity). It identifies business rules that constrain operations
OV-6b: State Transition Description	One of three models used to describe operational activity (activity). It identifies business process (activity) responses to events (usually, very short activities)
OV-6c: Event-Trace Description	One of three models used to describe activity (operational activity). It traces actions in a scenario or sequence of events

Once these models are developed they can be used to describe an organization in a simple logical architecture. This description can be used by the organization's decision makers to assist in developing requirements, operating concepts, and processes.

b. System Viewpoints

Systems Viewpoints are used to describe how the systems an organization uses support the organization's functions. The System Viewpoint models are designed to associate the operational viewpoint activities and display the exchange of information between those activities. The thirteen System Viewpoint models are described in Table 7.

Table 7. System Viewpoint Model (From U.S. Department of Defense, 2007, Vol 2, p. 201)

Models	Descriptions
SV-1 Systems Interface Description	The identification of systems, system items, and their interconnections
SV-2 Systems Resource Flow Description	A description of Resource Flows exchanged between systems
SV-3 Systems-Systems Matrix	The relationships among systems in a given Architectural Description. It can be designed to show relationships of interest, (e.g., system-type interfaces, planned vs. existing interfaces).
SV-4 Systems Functionality Description	The functions (activities) performed by systems and the system data flows among system functions (activities).
SV-5a Operational Activity to Systems Function Traceability Matrix	A mapping of system functions (activities) back to operational activities (activities).
SV-5b Operational Activity to Systems Traceability Matrix	A mapping of systems back to capabilities or operational activities (activities).
SV-6 Systems Resource Flow Matrix	Provides details of system resource flow elements being exchanged between systems and the attributes of that exchange.
SV-7 Systems Measures Matrix	The measures (metrics) of Systems Model elements for the appropriate timeframe(s).
SV-8 Systems Evolution Description	The planned incremental steps toward migrating a suite of systems to a more efficient suite, or toward evolving a current system to a future implementation.
SV-9 Systems Technology & Skills Forecast	The emerging technologies, software/hardware products, and skills that are expected to be available in a given set of time frames and that will affect future system development.
SV-10a Systems Rules Model	One of three models used to describe system functionality. It identifies constraints that are imposed on systems functionality due to some aspect of system design or implementation.
SV-10b Systems State Transition Description	One of three models used to describe system functionality. It identifies responses of systems to events.
SV-10c Systems Event-Trace Description	One of three models used to describe system functionality. Identifies system-specific refinements of critical sequences of events described in the OV.

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III. METHODOLOGY

A. INTRODUCTION

To meet the thesis objectives the researcher needed to identify, capture, and understand the interaction between the end user and the JTB. This was completed by performing research, including conducting a literature review (Chapter II), conducting interviews with process participants, using an architecture development tool to represent this information, and using the software tool to analyze the interactions.

B. INTERVIEWS WITH SUBJECT MATTER EXPERTS

1. Developing the Interview Questions

a. Development of Questions

The questions for the interviews were developed to capture the most information in an hour, so as not to disrupt the work schedules of participants. Interview questions were developed through a dialogue between the researcher and the thesis advisors. Final questions were selected in order to ensure the participants' answers would be focused upon the information sharing processes within the JTB enterprise.

b. Interview Questions

Table 8 contains the questions that were asked of the participants with respect to information flow.

Table 8. Information Flow Questions

Which nodes/activities within the JIEDDO Test Board (JTB) do you interact with?
How often do you interact with these nodes/activities? (Daily/Weekly/Monthly/Other)
What type of information is passed from you to other nodes within the JTB?
What type of information is passed to you from other nodes within the JTB?
How do you pass the information to other nodes within the JTB?
How do you receive information from other nodes within the JTB?

Table 9 contains the questions that were asked of the participants with respect to information usage.

Table 9. Information Usage Questions

Can you sketch the information flow within the JTB from your vantage point?
How do other nodes within the JTB communicate?
What type of products do you produce or publish?
What type of products do you obtain or use?
Do you use SIPRnet?
How often do you access SIPRnet?
Do you access the JTB SIPRnet web portal?
How often do you access the portal?
What information do you access on the portal?
Who generates the information on the portal?
What information do you need on the portal that is currently not there but available elsewhere? (i.e., Testing site portals)
Have you received training on the portal?
Did training include a review of the information available on the portal?
Did the training include procedures of how to access information on the portal?
How do you use the NIPRnet?
How is this process efficient? What is missing?
How is this process inefficient? What is missing?

The questions in Table 10 were used to refine the information provided thus assisting to produce accurate models.

Table 10. Information Refinement

Process: What happens inside this activity/node?
Input: What documents, online-data, or discussions do you need to begin this process? What information, very roughly, do these give you?
Output: What documents, information systems, or discussions does this node produce?
Trigger: What triggers communication with this node: a schedule and/or an event?
Periodicity: Is this node performed continuously or on-demand?
Periodicity: How active is this node (__ times per ___hr/day/wk/mo/yr)? Please state a range from low to high frequency?
Duration: How long does it take to execute this node?
Flow/Precedence: Does this node happen in parallel with other nodes? Which nodes?

2. The Interview Process

The research process used for this thesis included receiving Institutional Review Board approval, determining the interview participants, and developing the interview questions.

a. The Institutional Review Board

The methods used to gain information were in accordance with the Naval Postgraduate School Internal Review Board.

b. Participant Selection

It was determined that conducting interviews with members of the JTB Enterprise, to include subject matter experts (SME) from organizations within or associated with the JTB, would be able to provide the best description of the current processes of the JTB. All participants interviewed were recommended by the JTB as each participant had experience and knowledge about different aspects of the JTB Enterprise.

c. Interview Procedure

The researcher met with participants in a quiet setting beneficial to conducting an interview. The period of time spent with each participant varied, due to the participants' subject area and knowledge of the JTB as well as the participants' willingness to talk. The interview took an average of one hour to complete, however some interviews lasted longer due the nature of the participant's expertise. Interviews were recorded (when permitted) to prevent any loss of information provided by the participant. These interviews proved crucial in capturing critical information on each participant's organization or activity. In addition, several of the participants had recently been deployed to Afghanistan and Iraq where they served as convoy leaders and faced IED threats. These participants were interviewed to determine how the JTB and its

products and services are utilized by the end users. Interviews were conducted in person, which required travel to the various organizations and testing sites associated with the JTB enterprise.

The researcher traveled to interview participants at the various locations within the JTB Enterprise. Interviews were conducted with the participant(s) and researcher seated in a quiet room with the door closed. Participants were informed about the nature of the research and given consent forms to sign (the participants were assured that names would not be used). Participants were also informed that if there were any questions which caused any undue stress they did not need to answer. Once the forms were signed participants were asked the questions on information flow in Table 8 and 9. After answering those questions the participant was then asked the questions in table 10, depending upon the progress of the research at the time the participant were shown representative models of the JTB Enterprise and the JTB RFI Process, and asked to comment and/or correct the model.

d. Transcription

Participants were asked if the interview could be recorded; most agreed, however some did not. Some of the interviews were transcribed to ensure that all applicable information provided by the participants was used.

3. Obstacles to the Interview Process

Several obstacles had to be overcome throughout the interview process. In one instance the interview was conducted in a secure facility that restricted the use of personal electronic devices so the interview could not be recorded. In other instances some participants answered with short simple answers, such as merely a “yes” or “no,” providing little insight. Another obstacle was that some participants declined to be recorded; this was either due to the participant’s status as a contractor, or to the participant’s unease with the interview process. In all interviews, time was taken

immediately after the interview concluded to write down information the participant had provided during the interview to ensure the maximum amount of information was retained.

C. IMPLEMENTING DODAF

It became evident that in order to analyze the JTB from the end user perspective, the JTB Enterprise would not only need to be documented but the results of the interview process would need to be displayed in a manner that would provide all personnel associated with the JTB the means to fully understand the enterprise. To accomplish this, the objective was to graphically display the JTB Enterprise and the associated processes using the Department of Defense Architecture Framework (DoDAF). Results of the interview process were entered into a software tool, OpenText's ProVision. ProVision provides the capability to model the entire JTB Enterprise, and to simulate any process models developed. Training was received on the use of software tool (ProVision), which included how to enter data collected during the interviews into the tool in order to develop the Operational Viewpoints and System Viewpoint.

1. Developing Models

The DoDAF models chosen to represent the JTB Enterprise consist of three Operational Viewpoints (OV-1, OV-4, and OV-6) and one System Viewpoint (SV-1). These four models best describe the JTB Enterprise, keeping within the scope of the research. The OV-1 and the OV-4 were completed by using the information gathered during the interview process as an input to the software tool. The OV-1 was developed to show a broad overview of a JTB Process and how the end users and the JTB conduct the JTB RFI Process. The OV-4 was developed to depict the relationships and interactions the JTB has with the organizations included in the JTB Enterprise. The OV-6 was developed and refined then used to model the JTB RFI Process. The JTB RFI Process is not the only testing process the JTB executes, however it was selected as the process to represent the JTB Enterprise as it is performed within the JTB Enterprise. Other

processes, over which the JTB has some authority in accordance with the DoD Directive 2000.19, include JIEDDO initiatives; however, those processes involve organizations outside the scope of the research. The SV-1 was developed to represent the users of the JTB portal. The SV-1 was developed by using the participant's answers to the interview questions.

2. Simulating the OV-6 Model

Once the models were developed additional information was obtained through the JTB Portal. The information obtained from the JTB Portal consisted of statistical data on the JTB RFI Process. The statistical analysis entailed gathering the number of RFIs the JTB received in the year 2010. Each RFI was examined, in terms of the time taken to be resolved and the manner of resolution. This information was used in the OV-6 to refine the sources, destinations, activities and decision points of the OV-6. The model could then be accurately simulated. The parameters used to run the simulation consisted of one hundred runs times over a one year time frame and was based on the recommendations of one of the thesis advisors. These parameters allowed the model to be executed multiple times of the course of a year, which would provide assistance to determine the flow of information through the JTB Enterprise and display activities where the information may be impeded or delayed.

IV. RESULTS

Through the interviews and statistical research it was discovered that the JTB is an Enterprise contained within the larger JIEDDO Enterprise. This is significant since many of the roles associated with enterprises (such as human resources or payroll) are administered by the parent JIEDDO Enterprise; this makes the JTB Enterprise unique as it only needs to focus upon its tasking. The answers given in the interview process provided the data needed to develop the DoDAF models which have been designed to provide situational awareness to the JTB regarding the flow of information and the end user role in the enterprise.

A. OPERATIONAL VIEWPOINT (OV-1) OF THE JOINT IED DEFEAT TEST BOARD REQUEST FOR INFORMATION PROCESS

The purpose of an Operational Viewpoint 1 (OV-1) is to give an overview as to how a process or organization is aligned and display its lines of communication. Figure 3 is an OV-1 depicting the top-level flow of information during the JTB RFI Process as it passes through the major activities in the JTB Enterprise. Each of the organizations included in the OV-1 has the ability to generate a Request for Information (RFI) should an event occur or these organizations need information required to conduct mission tasking. This research is primarily focused on the end users, which can be any of the five organizations displayed on the right side of Figure 3. The Theater Operating Forces, such as US Forces Iraq and the Multinational Forces-Afghanistan, are the final end users of the JTB process and products.

The JTB can have either a direct or indirect effect upon these end users. A direct effect occurs when these end users generate an RFI. An RFI is generated by submitting the RFI through the Theater Support Web Tool (TSWT) or by making contact with either JTF Paladin or JTF Troy and having either of those two organizations generate an RFI for them. Once generated, the RFI follows the information flow as illustrated in Figure 3, passing once again through either JTF Paladin or JTF Troy to the end user.

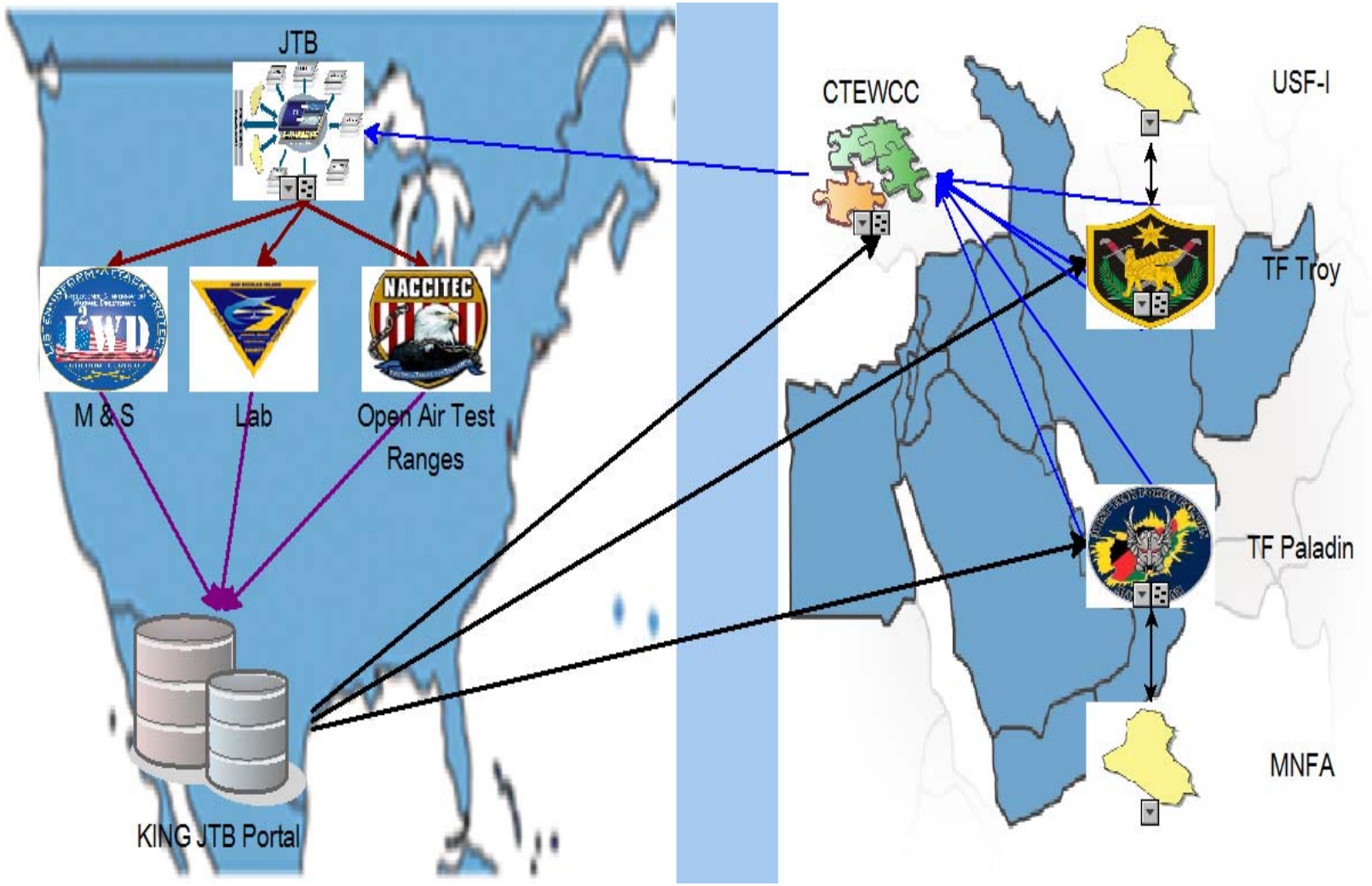

Figure 3. JTB Overview (OV-1)

JTF Paladin and JTF Troy work with forces within their respective theater of operations to provide training or develop processes and procedures. These processes and procedures are then implemented in the field by Battalion Electronic Warfare Officers (EWO) to assist in the protection of US and Coalition Forces. Under these circumstances JTF Paladin and JTF Troy act as the end user. In these situations an RFI generated by JTF Paladin or JTF Troy is also terminated at JTF Paladin and/or JTF Troy. The information from the RFI could then be passed to the operating forces in theater, which is an example of a situation where the JTB has an indirect effect upon the theater operating forces.

The Combined Theater Electronic Warfare Command Center (CTEWCC) is an integral and focal point of the RFI process. CTEWCC acts as a filter for RFIs and other CIED information as it collects inputs from all relevant organizations within the AOR and provides prioritization of testing requirements to the JTB. CTEWCC is also tasked with assisting in conflict resolution. If conflicts occur between any of these theater organizations that cannot be resolved, the CTEWCC Commander has the authority to make a final determination. The JTB will not accept any test priorities from CENTCOM organizations without first coordinating with CTEWCC. The key for CTEWCC is to build relationships with the commanders or officers in charge of the theater task forces and coordinate a unity of effort between them. This in turn will provide additional support when they request it (for example, to ghostwrite RFIs or even write them completely when they don't have time). In this manner CTEWCC is the Supporting Command whilst JTF Paladin and JTF Troy along with the other end users are the Supported Commands.

Once an RFI has cleared through CTEWCC it is forwarded to the JTB, who determines method of testing which is to be utilized to resolve the RFI. Three general methods, or types, of testing are used for RFI resolution: laboratory testing, modeling and simulation testing, and open air testing. At this point it is up to the JTB to determine which method is most beneficial; in some cases more than one method is used. Once the method of testing is assigned to a specific RFI it is then scheduled, planned, and tested by that organization. Upon completion of testing a test report is written and approved by the

testing organization and then posted to the JTB web portal. This portion of the process is very well organized and efficient and has led to the successful testing of over three hundred RFIs, adhering to the guidance set forth for the JTB in the DoD Directive which states it will "synchronize and coordinate all JIEDDO counter IED testing efforts."

Results of the testing are compiled, and a test report is written and posted to the JTB Portal, located on the SIPRnet. Upon uploading the test report to the portal, the Knowledge Information Network Group (KING) uses the data in the report to generate a product for the end users which displays the effectiveness of the CIED equipment that was tested. Test reports and other related JTB products available on the JTB Portal can be downloaded and utilized by the different theater support elements. It should be noted that information on the JTB Portal is pulled by the user, rather than pushed to all parties involved.

B. THE JTB ENTERPRISE

Using the results of the interview process a DoDAF model was developed using the ProVision software tool. This Operational View is an organizational model, more commonly known as an OV-4. The OV-4 encompasses and displays the JTB as an Enterprise displaying the organizations and activities which the JTB has either direct authority over, or has built a strong relationship with, to accomplish the mission of the JTB.

1. Structure of the JTB

The Joint IED Defeat Test Board (shaded gray and green in Figure 4) is located in three locations accessible to the Washington, DC Metro area: Crystal City, VA, Alexandria, VA (ATEC South facility), and Aberdeen, MD (ATEC North facility); the majority of the personnel are located in Alexandria, VA. The JTB organization follows a hierarchical staff structure with a Chairperson and a Director and then is further segmented into various functional areas, such as the Support and the Operations divisions. The JTB operates within and across these different functional areas

necessitating a robust, knowledge dependent organization. In order to fulfill the many duties assigned to the JTB, contractors have been hired to provide specialized assistance and expertise.

The JTB also employs the use of working groups (shaded orange in Figure 4). These working groups consist of subject matter experts (SMEs) who collaborate and provide recommendations to the JTB Director, such as testing protocols. There are currently eight working groups; Knowledge Management, Information Technology, Threats, Test Operations, Advanced Communications, Foreign Disclosure, and Electronic Attack Clearance. The working groups are also consistent with the functional areas conducted within the JTB.

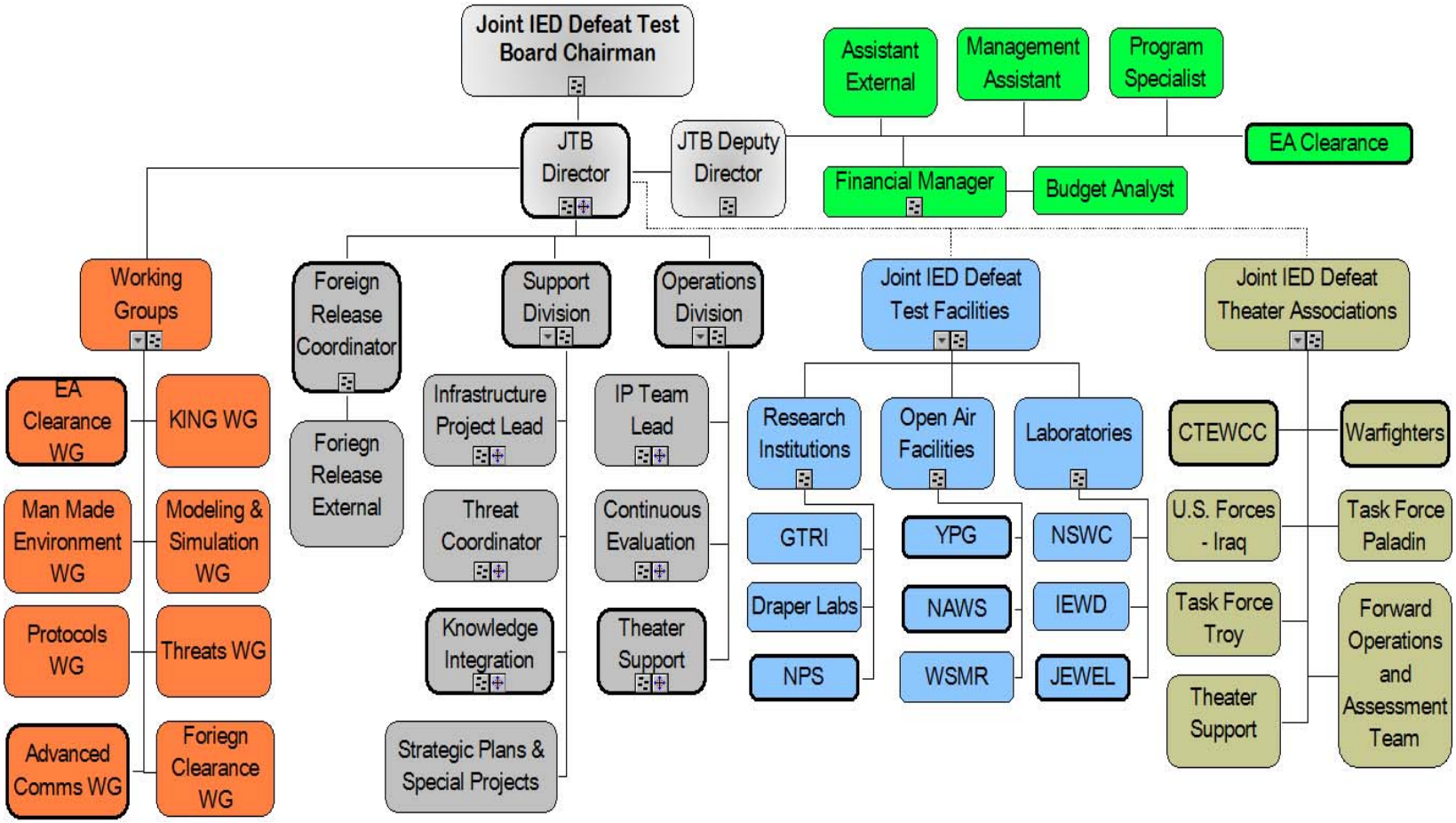

Figure 4. JTB Enterprise OV-4

2. Organizations Associated with the JTB

Many organizations are associated with the JTB. Figure 4 is not all inclusive, as the JTB has the ability to use a multitude of resources in order to comply with its tasking. In Figure 4 the organizations associated with the JTB are linked to the JTB Director with a dashed line, the dashed line represents the relationship between the JTB and the various organizations as a working relationship rather than a hierarchical relationship. Of these organizations with ties to the JTB some are used more often than others, yet all are important as each organization provides a specific asset which the JTB can utilize, thus maximizing the effort while supporting the end user.

a. Testing Agencies

The JTB employs the use of many different testing agencies which include open-air testing, laboratory testing and modeling and simulation organizations. Each organization offers a different means for the JTB to accomplish its mission. The JTB counts on these organizations for specific tasking; it is the specificity that assists the JTB in decreasing redundancy in testing which is directed in the DoD directive. The use of multiple testing agencies also gives the JTB flexibility to conduct many concurrent tests.

(1) Open Air Testing Facilities. Open air testing plays a vital role in JTB's ability to provide quality products to the end user. The open air testing sites employed by the JTB include but are not limited to Yuma Proving Grounds (YPG), Naval Air Weapons Station China Lake (China Lake), and White Sands Missile Range (WSMR). Each of these sites has the ability to replicate any environment JTB testing requires including electromagnetic, temperature and urban/rural environments. These open air sites also have the ability to manipulate the test environment in order to simulate the true environment where the result of the test will be used. Testing environments are developed in accordance with specific criteria obtained from a Request for Information (RFI), a vendor's specifications, or test protocols set forth by the JTB.

(2) Laboratories and Universities. Laboratories and universities offer the JTB a means to conduct testing in a controlled environment. Laboratories offer the JTB the ability to test not only equipment but protocols and/or procedures as well.

This is advantageous to the JTB and the end user since this testing can often be conducted quickly and at a lower cost than open air testing. Testing at the different laboratories and universities may also consist of modeling and simulation (M&S). The ability to develop and execute models affords the JTB another avenue for effective testing at a lower cost than open air testing.

b. Theater Elements

(1) End User. The end user (shaded light brown in Figure 4) is the war fighter. In this sense the end users are the members of the Armed Services who, by the nature of their work, are in close proximity to the IED threat. The end users utilize JTB products which are passed to them via Battalion Headquarters, turnover of equipment with other users, or other theater operational support elements. The end users receive the JTB products and put them into practice when operating in a region where the possibility of encountering an IED is elevated. The end users have their lives on the line and are dependent upon the effectiveness, as well as the availability of, the products produced by members of the JTB.

(2) Theater Operational Support. Theater operational support elements include the different organizations that fall within the JTB's scope of operations. The JTB relies on many organizations to ensure testing conducted is relevant to the end user as well as ensure the end user has the proper JTB products in order to succeed. One such organization is the Combined Theater Electronic Warfare Control Center (CTEWCC), described in section A of this chapter. Other theater support elements consist of JTF Paladin and JTF Troy and the JTB Forward Operating and Assessment (FOA) teams. Each of these organizations works with both the end users and the JTB to ensure testing is relevant and the priority of the test is understood. These elements also have the capability to submit RFIs to the JTB through the TSWT.

C. THE JTB RFI PROCESS

Many processes are incorporated within the JTB while accomplishing its mission, such as payroll and other monetary processes, however, the scope of this research was to focus upon the end user. The JTB RFI Process was chosen to represent the interactions of the JTB Enterprise as it is includes the end user. The JTB RFI Process model was developed to be displayed as a DoDAF OV-6 in order to be simulated, and simulation results are intended to provide an accurate representation of the process. Figures 5 through 8 depict the JTB RFI process.

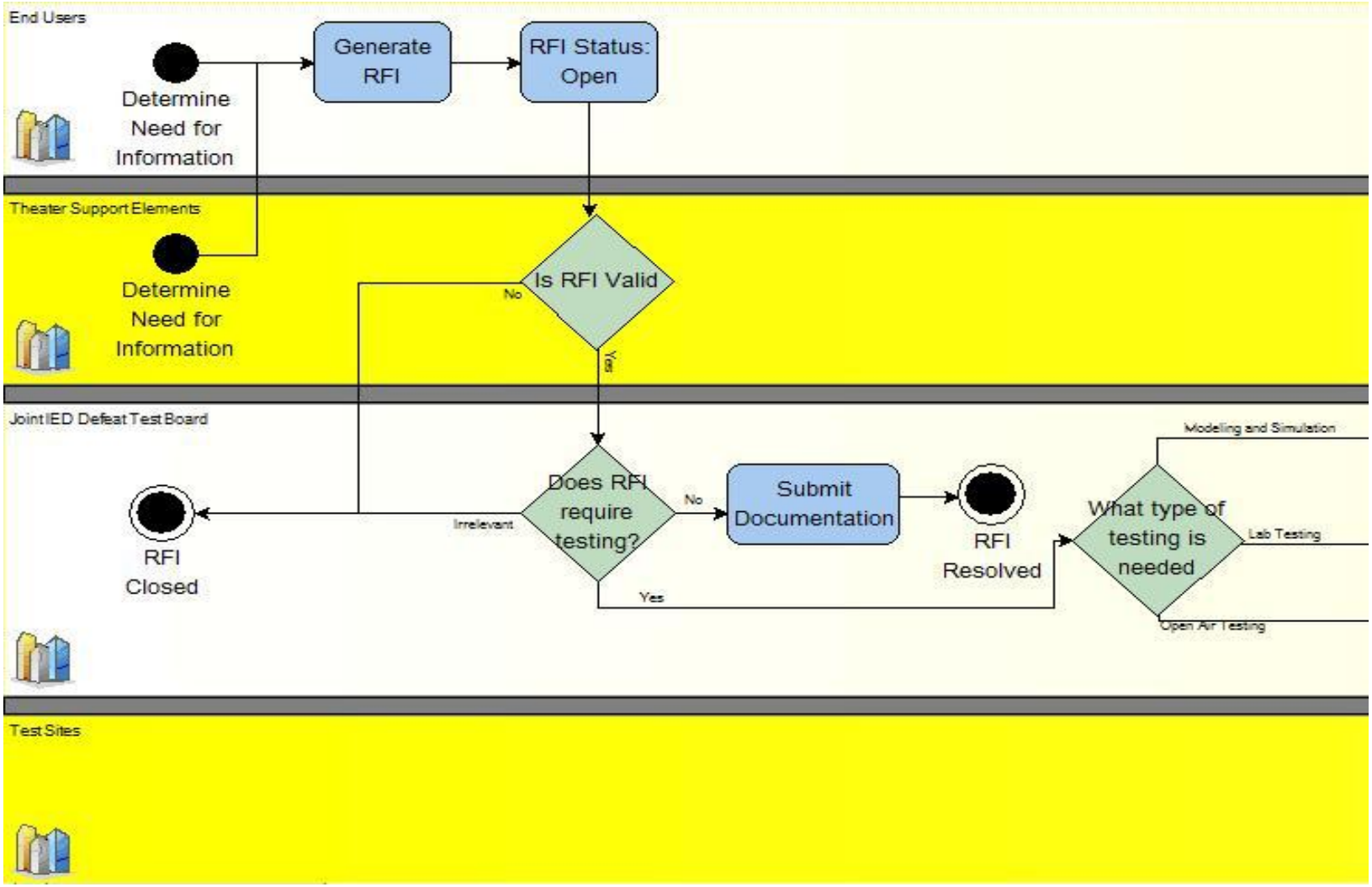

Figure 5. The JTB RFI Process

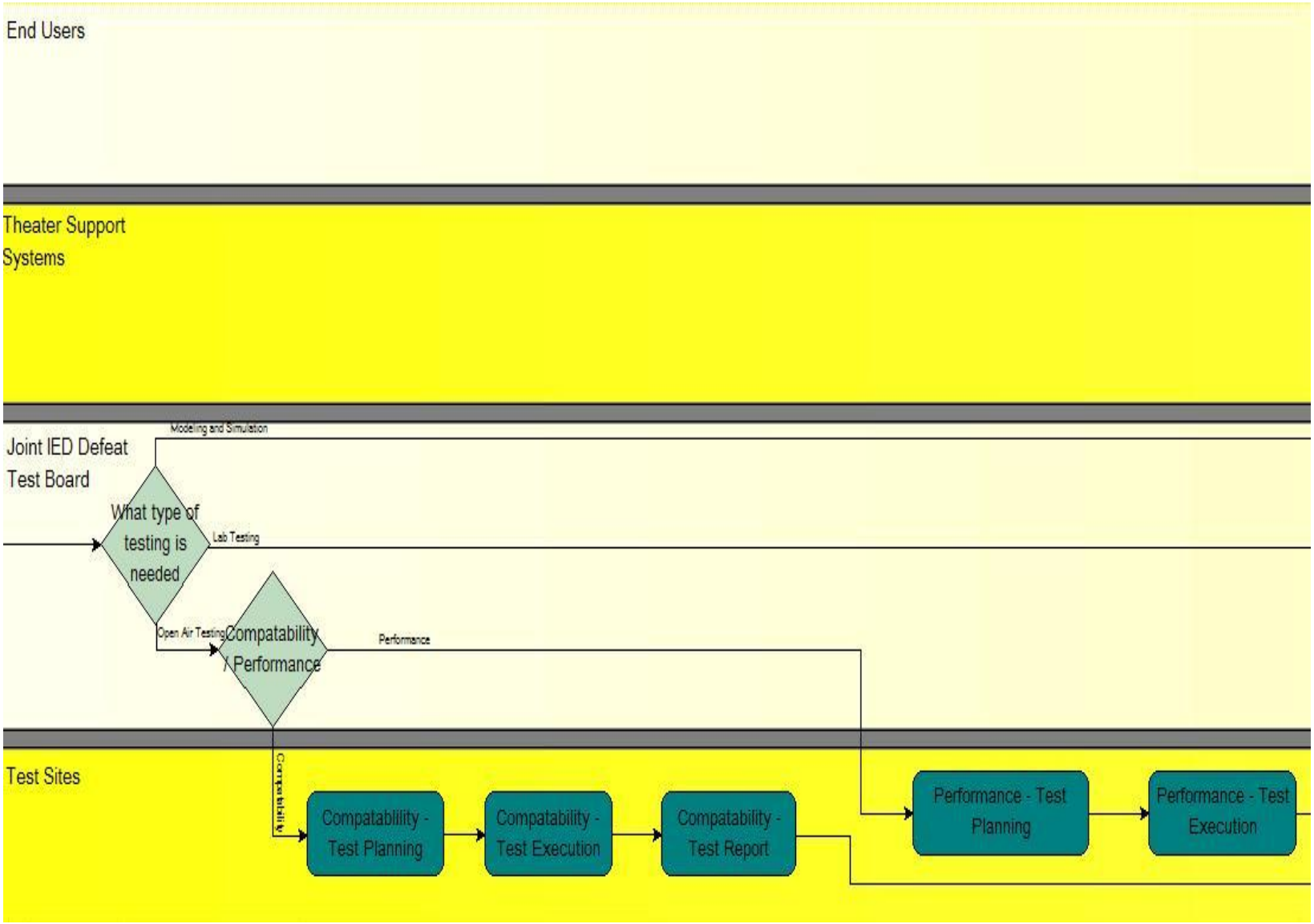

Figure 6. The JTB RFI Process

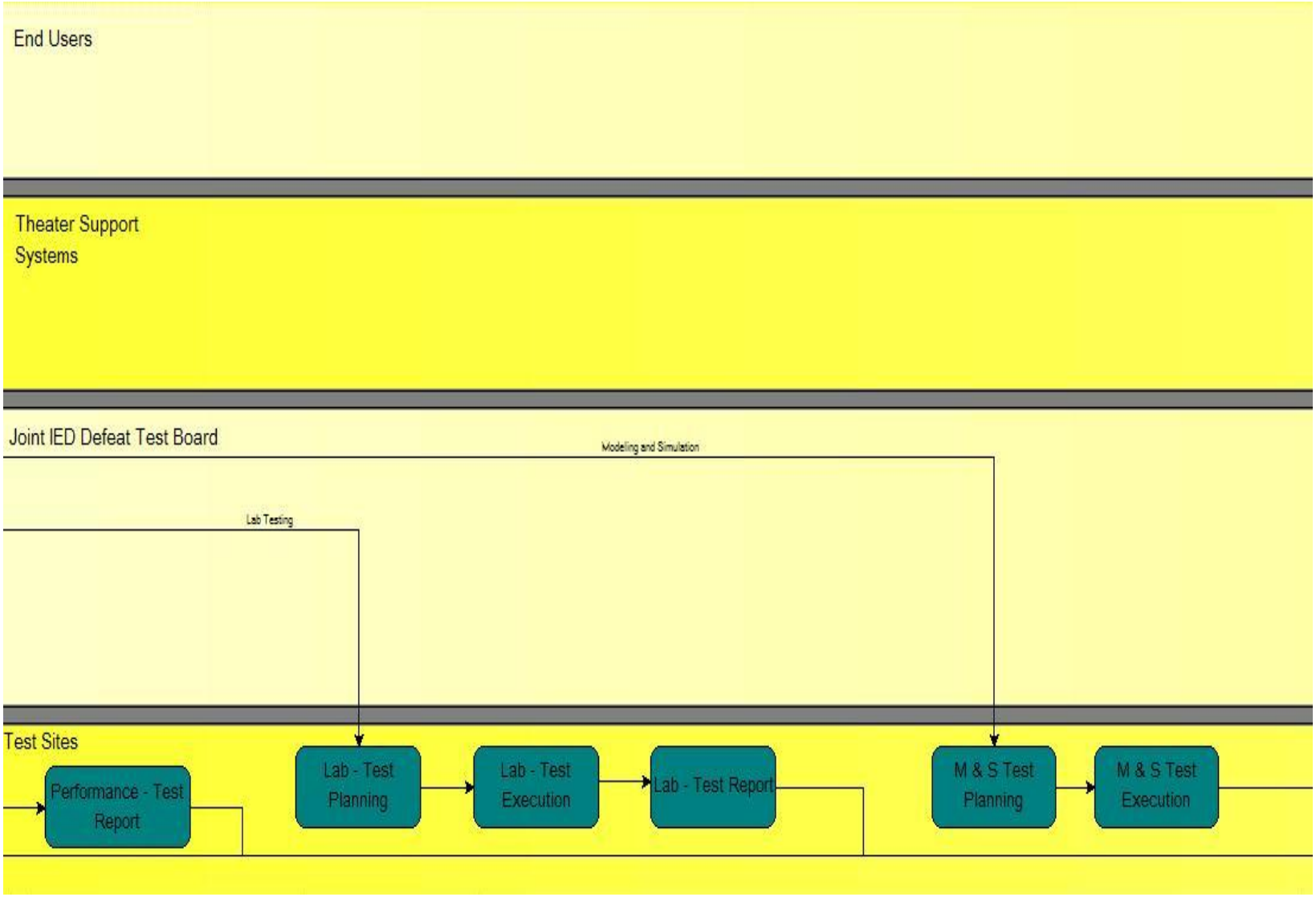

Figure 7. The JTB RFI Process

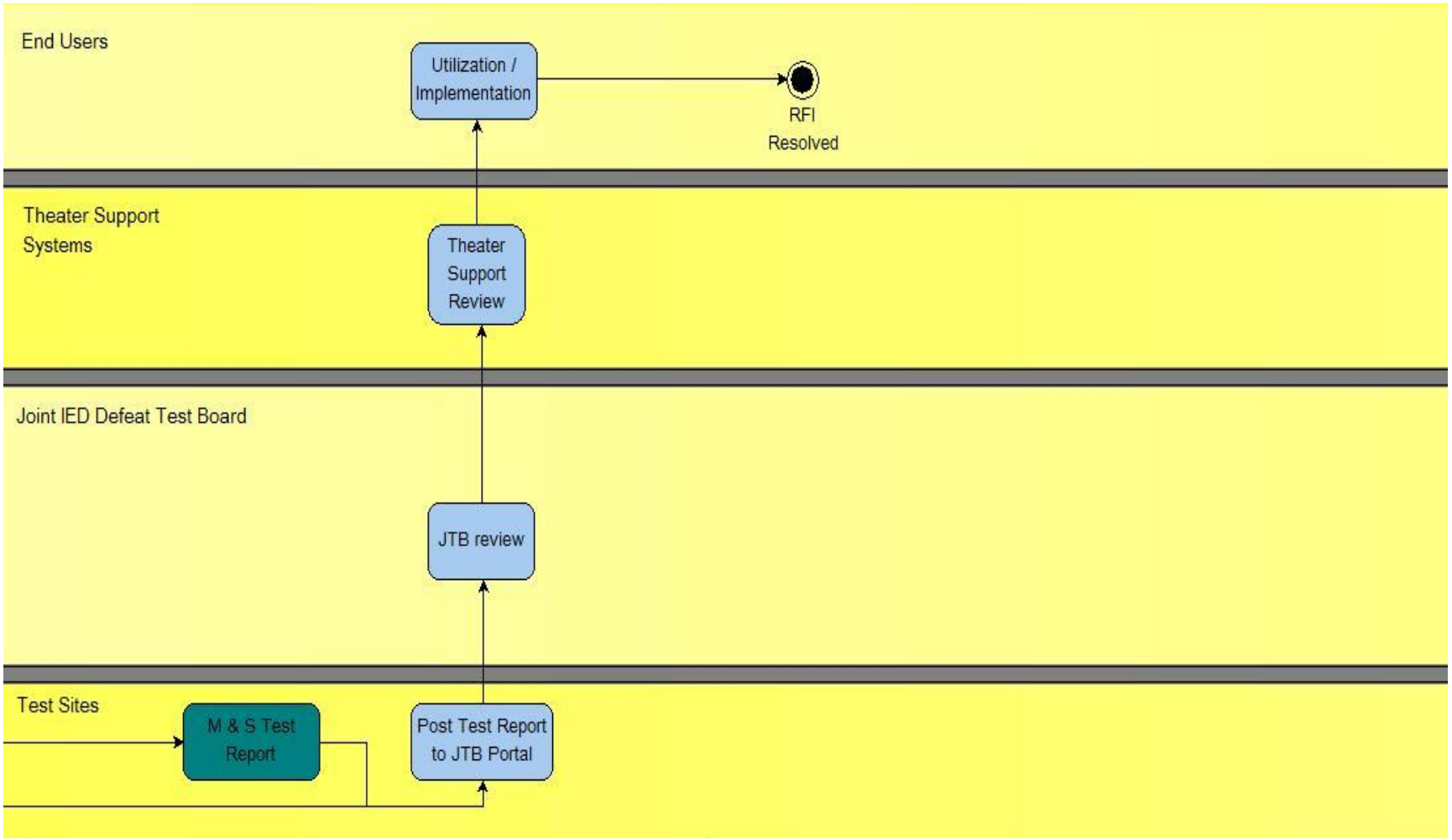

Figure 8. The JTB RFI Process

1. Activities and Decision Points

The JTB RFI Process (shown in Figures 5–8) consists of nineteen activities. Each activity represents an action taken by an organization within the JTB enterprise. The organizations are arranged horizontally while the sequences of the process have the ability to move both horizontally and vertically. Tables 11 and 12 describe the activities and decision points contained within the OV-6.

a. JTB RFI Process Activities

The JTB RFI Process contains 19 activities that are described in Table 11.

Table 11. JTB RFI Process Activities

Activity	Description
Generate RFI	Once an end user or theater support personnel have determined a need for information, the Theater Support Web Tool (TSWT) is utilized in order to generate a request for information.
RFI Status: Open	The status of an RFI becomes open once it has been submitted through the TSWT.
Submit Documentation	Proper documentation is located and posted to the JTB Portal and sent to generator of RFI
Compatibility Test Planning	During the test planning phase information is gathered, based upon RFI input, and test is scheduled and planned based upon current protocols.
Compatibility Test Execution	Execution of compatibility testing occurs once the test plan has been developed and permission has been granted.
Compatibility Test Report	Upon completion of compatibility testing, an initial quick-look is generated and submitted to all subscribers of the RFI. Also an official test report is drafted and submitted for approval. Once approved the test report is posted to the JTB SIPRnet web portal.
Performance Test Planning	During the test planning phase information is gathered, based upon RFI input, and test is scheduled and planned based upon current protocols.

Activity	Description
Performance Test Execution	Execution of performance testing occurs once the test plan has been developed and permission has been granted.
Performance Test Report	Upon completion of performance testing, an initial quick-look is generated and submitted to all subscribers of the RFI. Also an official test report is drafted and submitted for approval. Once approved the test report is posted to the JTB SIPRnet web portal.
Lab Test Planning	During the test planning phase information is gathered, based upon RFI input, and test is scheduled and planned based upon current protocols.
Lab Test Execution	Execution of laboratory testing occurs once the test plan has been developed and permission has been granted.
Lab Test Report	Upon completion of laboratory testing, an initial quick-look is generated and submitted to all subscribers of the RFI. Also an official test report is drafted and submitted for approval. Once approved the test report is posted to the JTB SIPRnet web portal.
M & S Test Planning	During the test planning phase information is gathered, based upon RFI input, and test is scheduled and planned based upon current protocols.
M & S Test Execution	Execution of modeling and simulation testing occurs once the test plan has been developed and permission has been granted.
M & S Test Report	Upon completion of modeling and simulation testing, an initial quick-look is generated and submitted to all subscribers of the RFI. Also an official test report is drafted and submitted for approval. Once approved the test report is posted to the JTB SIPRnet web portal.
Post Test Report to JTB Portal	Once testing is completed the testing agency posts the report to the JTB Portal in order to provide information to the JTB Enterprise.
JTB review	JTB inputs test report data to database
Theater Support Review	Theater support elements review and disseminate information to end users

Activity	Description
Utilization	End users apply results and modify TTPs based upon new information

b. JTB RFI Process Decision Points

The process also contains four decision points, which are described in table 12.

Table 12. JTB RFI Process Decision Points

Decision Point	Description
Is RFI Valid?	CTEWCC determines the validity of the request. If the RFI is deemed to be a valid request it is then sent to the JTB for further determination of the manner in which the RFI will be resolved.
Does RFI Require Testing?	This is determined by JTB personnel. A no decision leads to the RFI being resolved by sending documentation to the generator of the RFI, for example the documentation could be a previously published Test Report or a publication from the manufacturer. A no decision could also lead to a study conducted in an academic setting. A yes answer leads to other decision points to determine the type of testing. If more information is required to determine testing type or procedures, the RFI originator is contacted in order to answer questions.
What type of testing is needed?	This decision is used to determine how the RFI will be resolved. The options include: open air testing, laboratory testing, or modeling and simulation.

Decision Point	Description
Compatibility/ Performance testing	If it is decided that open air testing will be conducted the RFI is then forwarded to an open air facility to conduct either compatibility or performance testing. This decision is determined by the information given in the RFI.

2. Sequence of the JTB RFI Process

The process is started, once a need for information is determined by either an end user or a member of a theater support system. An RFI is generated within the Theater Support Web Tool (TSWT) on the SIPRnet (which was considered to be accessible by all participants involved in the interview process). Upon submitting the RFI the status is switched to "Open" and sent to CTEWCC for review as CENTCOM has mandated that all JTB RFI requests from CENTCOM AOR will be passed through and approved by CTEWCC. CTEWCC then determines the validity of the request. If the RFI is deemed to be a valid request it is forwarded to the JTB for further determination of the manner in which the RFI will be resolved. In this way CTEWCC acts as a filter between the JTB and the theater support systems/end users.

The JTB receives the RFI and its priority (assigned by CTEWCC) via notification by the TSWT. JTB personnel determine how the RFI will be resolved. If it is decided that testing is not required, documentation (such as a prior test report and/or a manufacturer's manual) is sent to the generator of the RFI. If the RFI requires testing it is forwarded to one of the test agencies, which leads to other decision points to determine the type of testing. The "else" decision is used in case the RFI is deemed invalid and thus closed. If more information is required to determine testing type or procedures, the RFI originator is contacted to obtain clarification.

The next decision is to determine if the RFI will be resolved using an open air test range, a lab, or modeling and simulation. In any of the three cases the testing has been broken down to three essential activities. The first is the planning portion of the testing.

The test agency will plan and schedule the test in accordance with protocols set forth by the JTB and the RFI. The test sites use this time to reach out to the RFI generator or CTEWCC should any questions arise. This is an invaluable step as it ensures the testing is planned and executed to provide the best support the end users. The next two steps of the RFI process (Test Execution and Test Report) are performed by the test agency, however the JTB is heavily involved as it monitors and synchronizes the testing during a weekly video teleconference (VTC) with members of the enterprise as well as members of JIEDDO. With the testing completed the test agency posts the test report to the JTB web portal for all interested parties to view. The data within the test report is then used by the Knowledge Information Networking Group (KING) to generate products which can be easily interpreted by the end user and viewed on the TSWT.

3. JTB RFI Process Simulation Results

In 2010, the JTB responded to 55 RFIs. Overall, the average time from RFI initiation to a response available to the end user was 16 days. However, the response time varied greatly and was dependent upon on the method used to resolve the RFI. The amount of time for a given activity was derived from the statistical research, and the distribution of those times was based upon a statistical analysis of the number of RFI submitted in a calendar year and the amount of time taken to resolve the RFI. Table 13 displays the results of the statistical analysis conducted on the number of RFIs submitted in 2010. The standard deviation for the open air and the modeling and simulation RFIs is larger than the average time taken to resolve the RFI due to the wide disparity in the number of days taken for RFI resolution.

Table 13. Results of JTB RFI Statistical Analysis

Type of resolution	# RFI's	Average time to resolution (in Days)	Standard Deviation
Paper/Lab Resolved	18	13.75	12.2632118
Open Air Resolved	27	13.74074074	17.43910855
Mod/Sim Resolved	9	32.88888889	43.2274347
Academic Analysis Resolved	1	4	0

Figure 9 depicts the result of the JTB RFI Process simulation. It shows the average time spent at each of the activities. The information entered into each of the activities was based upon the data in Table 13. The OV-6C captured in the ProVision tool can easily be adjusted to reflect changes to the RFI process or to any of the activities within the JTB RFI Process. These changes normally take, at most a few hours of effort.

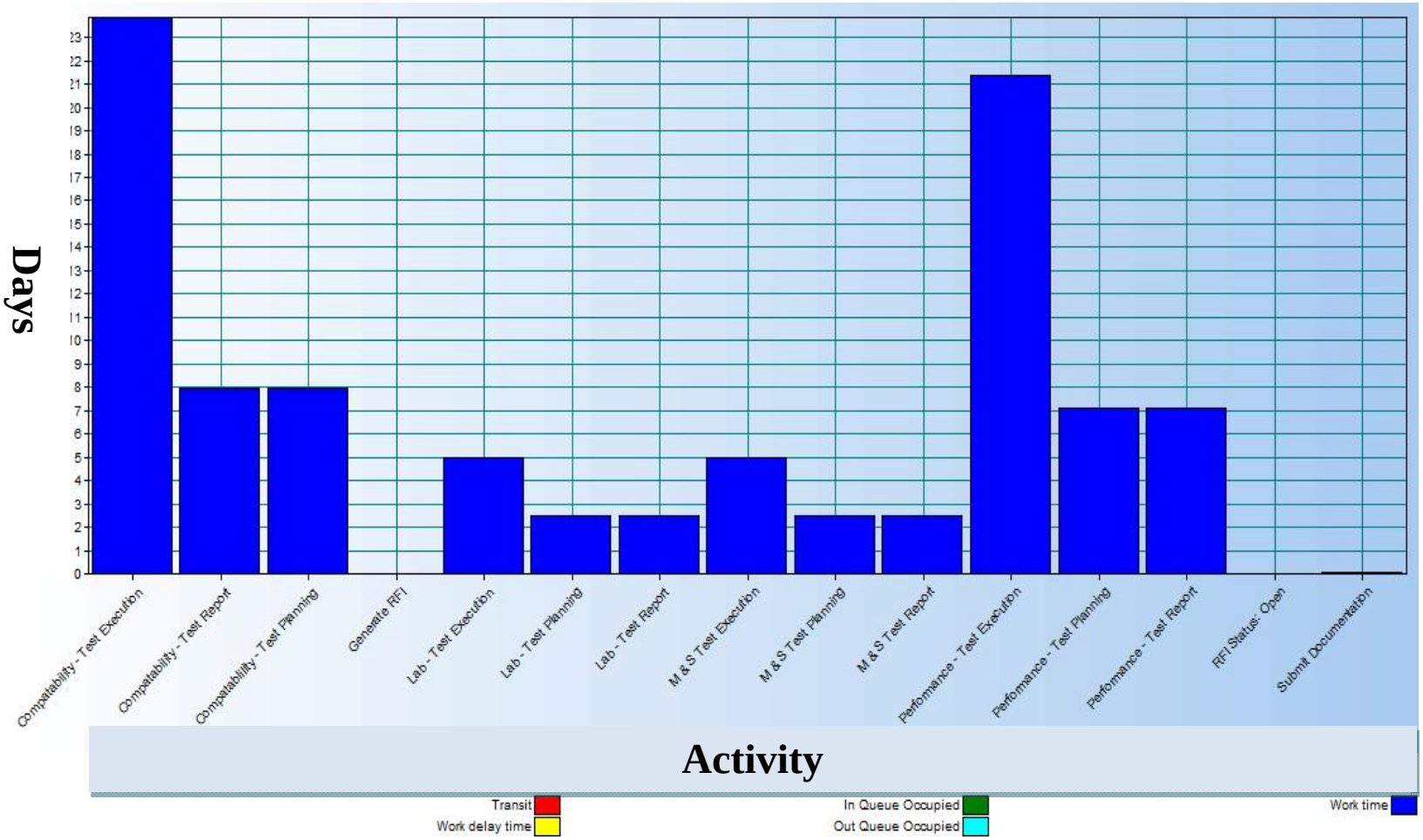

Figure 9. RFI Process Simulation Result

D. DESCRIPTION OF THE SYSTEM VIEWPOINT

The system viewpoint is used to illustrate how users access the JTB Portal.

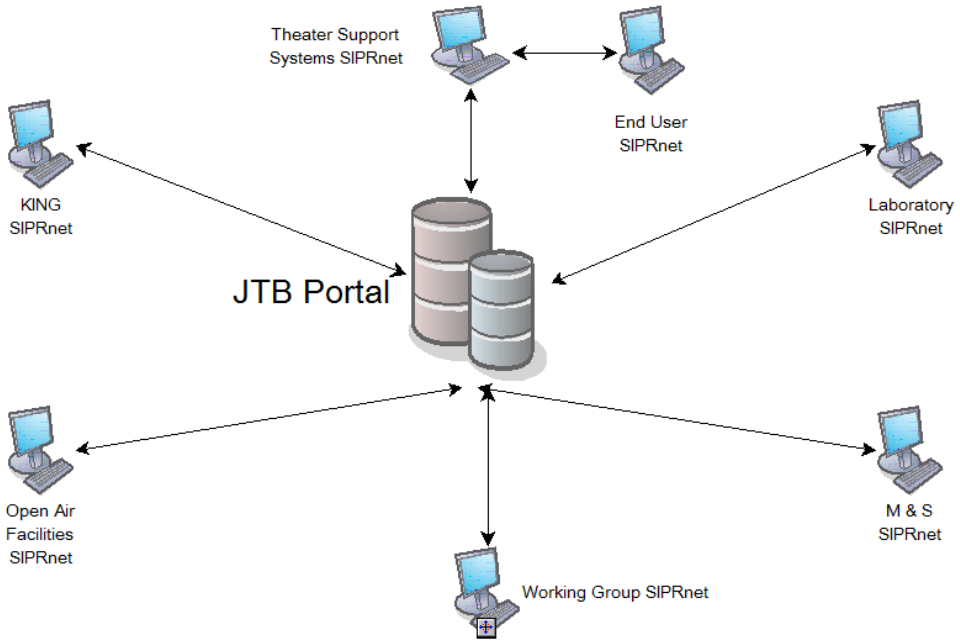

Figure 10. JTB Portal System Viewpoint-1

Figure 10 depicts the users of the JTB Portal. The JTB Portal is structured as an Oracle database hosted at the Yuma Proving Grounds. Members of the theater support systems use the portal to gain information to assist in their development of procedures to be implemented in their Area of Operations. Members of the working groups have access to an area of the portal that can be utilized to post information. The testing agencies also have access to post the test reports and pull the information needed to support executed testing. The JTB Knowledge Information Networking Group (KING) designed the portal and also administers its use. However, it is also a user of the portal as it develops JTB Products after the test reports are posted.

The JTB Portal contains links to other relevant websites and portals associated with the JTB Enterprise. For example the TSWT is a separate web portal. Therefore, separate accesses are required in order to utilize all of the tools available to the users.

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V. CONCLUSIONS AND RECOMMENDATIONS

The goal of this thesis is to analyze end-user interaction with the JTB, to support developing recommendations for improving this interaction. An architectural process capture method was used to identify key activities and support the analysis reported in this chapter, and is based on the literature review, which suggests three key elements to operating a successful process in support of war fighters. Those elements are organizational structure, collaboration, and the related information sharing that can best support the end user. The findings, conclusions, and recommendations of this chapter are based upon an analysis of the JTB Enterprise with respect to the three key elements. Since the interaction with the end user is most important, that activity analysis begins this discussion.

A. IMPACT OF THE JTB ON THE END USER

The interaction between the JTB and the end user is both direct and indirect. Direct interaction occurs through tools such as the Theater Support Web Tool (TSWT), which provides the mechanism for the end user to input a Request for Information (RFI). The TSWT also affords the end user the ability to track the status of the request to its resolution. The JTB also has direct interaction with the end user through pre-deployment training provided to the Electronic Warfare Officers (EWO). Training includes information about the purpose of the JTB and products developed. Indirect interaction occurs through the theater support elements (which could also be end users) as these elements use the information gathered from a resolved RFI to develop guidelines and procedures, which in turn are used by the end users.

Until recently the theater support elements had a direct means of communication with the end users. Initially, EWOs from the Navy and the Air Force were first assigned to the theater support elements and then the theater support element units to whom the EWOs were assigned would embed the EWOs within deployed units. This gave the theater support elements a means of constant interaction with the end users. However, presently the Army has increased its cadre of EW officers, replacing the Navy and Air

Force EWOs, and these Army EWOs are now organic to deployed units. While this different dynamic has not completely severed the flow of information to and from the end users, it has hindered it.

It was discovered through interviews with the end users that many of them were not familiar with the JTB but they were familiar with JIEDDO. Upon learning of the JTB each of the end users stated that the tools available on the JTB Portal would be useful in the field, implying they had not seen or used the JTB Portal or other associated web tools, such as the TSWT. Based on this research one recommendation is that the JTB conduct briefs periodically with EWOs in order to gain ideas to improve the support and/or products provided to the end users. The intention of these briefs would be to initiate a dialogue with the end users which would provide the JTB a means to improve all processes across the enterprise. Another recommendation is to invite EWOs to attend the weekly Video Teleconference (VTC). EWO attendance would greatly increase situational awareness, and this could be implemented by simply having battalion EWOs attend early in their rotation, or it could be requested that attendance to the VTC be part of the turnover process.

JIEDDO uses social networking as a means to provide information to associated and interested personnel across its enterprise. This may also be a vehicle for the JTB to improve its visibility to the end user. Having a social networking site gives the JTB the ability to broadcast pertinent information to all personnel associated with the JTB. This social networking site could also be used to increase awareness about the JTB since it is not required to be associated with the JTB Enterprise in order to be a member of the JTB social networking site.

B. ANALYSIS OF THE JTB ENTERPRISE

The JTB Enterprise consists of relationships which have existed since the JTB was formed in 2006. As with any Enterprise, the JTB Enterprise contains organizations over which the JTB has no direct authority. In these cases the JTB has established working relationships, however there is no established guidance or written policy that specifies the nature of the relationship. The current relationships with the test sites are

established through contracts, however these contracts exist only between the JTB and the test site. Guidance that includes and describes the relationships between the organizations for the entire enterprise would increase situational awareness across the enterprise.

1. Organizational Structure Analysis of the JTB Enterprise

The structure of the JTB enterprise is aligned with three of the organizational structures described by Mintberg and discussed in Chapter II. The JTB enterprise combines the flexibility of the simple structure, the standardization of skills of the professional bureaucracy, and the ability to communicate across domains of the adhocracy. The JTB Enterprise is a flexible enterprise mainly due to the nature of the tasks which are being conducted by each of the activities of the enterprise. The environments the test sites are replicating are dynamic and the flexibility to adapt and change has proven to be a tremendous strength of the JTB Enterprise. It is not uncommon for a test to be planned and executed in a matter of days. This remarkable response time is achieved through existing working relationships, which have been forged over time. However, should any of the personnel exit the JTB enterprise then that line of communication could be severed resulting in a loss of flexibility. To maintain such flexibility, a set of guidelines or policy should be developed which promotes the growth of trust amongst people from the different organizations within the JTB enterprise.

Standardization of skills, as in the professional bureaucracy, has been maximized by separating the type of testing conducted at each of the test sites. This division of labor has resulted in an increased level of specialization at the test sites, which has mitigated redundancy in testing, one of the five areas of authority given to the JTB by the DoD Directive. Reliance upon the operating core, that is, the test sites, and its ability to operate autonomously is another characteristic which indicates the JTB Enterprise operates as a professional bureaucracy. The independent environment of the professional bureaucracy calls for little coordination or formalization between each of the specializations of the operating core. It is the JTB that provides a means to coordinate

and collaborate through use of the JTB Portal, as seen in Figure 10, which depicts members of the operating core and the lines of communication to the JTB Portal.

Communicating across domains, which refers to the way organizations interact in an adhocracy, may not be the ideal method for the JTB Enterprise. Communication is an essential attribute of organizations, however if the test sites were to begin coordinating without JTB oversight information could be lost and testing may become redundant.

The JTB Enterprise falls within the Coordination quadrant of Figure 1, as the enterprise is comprised of distinctive organizations that require access to shared information. The JTB Portal is the means the JTB has elected to provide shared information to the JTB Enterprise.

2. Organizational Relationships within the JTB Enterprise

Information gathered from the interviews provided the bulk of the information used to develop the OV-4, and were essential to understanding the existing relationships in the JTB Enterprise. However, the interviewees expressed a common concern regarding a lack of communication within the enterprise, which was attributed to the fact they did not know who or how to contact other members of the enterprise. This lack of communication could be mitigated by keeping an updated point of contact (POC) list. Developing and publishing a POC list could prove to be a daunting task, yet once compiled it could be invaluable, in terms of fostering an increase in communication throughout the enterprise. Due to the rate of turnover of personnel within the enterprise, it is recommended that the POC list be evaluated and updated on a quarterly basis. Consideration should also be given to posting this POC list on the JTB portal.

Working groups are manned by subject matter experts in the field related to their respective working group, and are formed by the authority of the JTB Director. The JTB working groups provide a critical and useful service in the development of testing protocols. Currently there is no guidance governing the structure of the working groups. Using the discussion boards located on the JTB Portal to post information for each of the working groups would help ensure that the latest protocols are used in the testing process to provide the best support to the end user.

3. Final Analysis of the JTB Enterprise

One glaring omission from the JTB Enterprise is the position of a Chief Information Officer (CIO) or a Chief Technology Officer (CTO). It is recommended that a CIO/CTO be appointed and given authority to institute policies and protocols which would govern the massive amounts of information produced by the test agencies. Each test report is written with the same structure, however most if not all of the data is held by the agency conducting the test. A CIO/CTO with authority could compile the data in a manner that would be useful to the Enterprise and assist in ensuring there is no redundancy in testing, as stated in the Directive. The JTB Enterprise can be used as an example of an organizational structure for many DoD as well as non-DoD organizations, since the level of complexity of the organization has been mitigated by using specialists to perform their tasks while the JTB, which is the strategic apex of the enterprise, provides the oversight required for the entire enterprise to perform its duties.

C. THE JTB PROCESS ANALYSIS

The JTB RFI Process is efficient. From 2006 through 2010, over three hundred RFIs have been processed. However, it is not the number of RFIs that have been processed that is impressive, it is the flexibility and swiftness in which the RFIs are tracked and resolved. The flexibility of the RFI Process allows an RFI to be prioritized and executed in a short amount of time, giving time-critical results to the end user. The process spans the entirety of the JTB Enterprise as each member of the Enterprise contributes to a portion of the process. These contributions range from personnel conducting tests to personnel generating RFIs to budget analysts.

1. JTB Process Collaboration

Collaboration in the JTB RFI Process is essential for the process to support the end user. The meaning of collaboration is to work together and the structure of the JTB RFI Process encompasses the entire JTB Enterprise, thus capitalizing on the expertise of the personnel involved. Weekly VTCs support collaboration as all the stakeholders of the

JTB Enterprise as well as members of JIEDDO are able to provide information to each other. These VTCs help to provide situational awareness regarding the status of JTB RFI Process.

The JTB RFI Process depicted in Figures 5 - 8 includes only four decision points; however other decisions are made at various points of the process within some of the activities. These decisions are made by the subject matter experts and are vetted through the rest of the JTB RFI Process stakeholders at the weekly SVTC. The collaborative environment of the JTB RFI Process has been evolving into this current state which is effective, and as it continues to evolve it will increase its product and support thus giving the end users a competitive advantage over their adversaries.

2. JTB Process Recommendations

The process may be efficient; however, there are a few areas where it can be improved. Currently, there is no policy governing the process; the only information uncovered regarding the RFI Process was a TSWT user manual which is located on the SIPRnet. The user manual provides instruction on generating an RFI. It also provides a description of the process, yet the authority to execute the process is nonexistent. While it may seem trivial to have a policy written which would restate what is currently happening, a written policy would be beneficial to the end users as it would inform all participants of the process that occurs in each of the activities. This policy can then lead to the JTB RFI Process certification. Certifying the process could give the JTB the flexibility to interchange personnel without disrupting the JTB RFI Process.

Another recommendation is to institute a tracking mechanism for the RFI Process, which can be implemented by updating the RFI submission form. Currently the submission form does not offer a means to input any personal information, such as an e-mail address. The ability to provide an e-mail address to be attached to the RFI as it traverses the process gives everyone associated with that RFI an efficient way to reach out to the person who submitted the RFI to gain further information (if required). A tracking mechanism could also provide a way for the person who submitted the RFI to receive automatic status updates at different RFI Milestones, such as when it is resolved.

It would also prove useful if the end user, more specifically the EWOs, could have a static email address assigned by the JTB. A static email address that would be turned over between personnel, would improve the lines of communication. This email address could be used by the JTB to reach out to the end user should questions arise about an RFI.

D. THE JTB PORTAL

The JTB Portal was analyzed while conducting the research needed for the development of the OV-6. The portal has useful links to the organizations associated with the JTB Enterprise. A username and password are required to access the Portal, thus controlling access; however each of the websites needed for the RFI Process requires different usernames and passwords. A single sign-on portal would allow one to generate an RFI within one session. The portal also has discussion boards for each of the working groups to use for collaboration; however most are not used nor had been used in over a year. A CIO/CTO, as recommended earlier in this chapter, given proper authority could require the use of the message boards and the portal. The use of the JTB Portal would provide a central point for all information generated by the JTB Enterprise to flow. The Portal has the potential to become a relevant source of information to the end user, yet without policy or a public relations campaign it will continue to be a useful tool that goes unused.

E. AREAS FOR FUTURE RESEARCH

The models that have been developed for this research were intended to uncover and make explicit the interactions of the JTB with the end users, however the models can offer much more than a display of the information flow used for the JTB RFI Process. The software tool used to develop the models includes algorithms which can analyze other variables, most notably cost. The JTB RFI Process can be manipulated to conduct "what if" analyses, such as updating each of the activities to reflect its monetary value. Analysis of this nature could be used in determining the cost of the current process. Once cost is established the model can then be used to determine ways to resolve RFIs in a way that is more fiscally efficient. Cost is not the only variable that can be manipulated; the

efficiency of the model can also be analyzed, in order to develop alternative methods which would increase the level of support to the end user.

F. FINAL ANALYSIS

The JTB as an Enterprise and an organization is efficient and adheres to the guidance set forth by the DoD Directive. Documenting the JTB Enterprise, its people, processes, and products, and instituting guidance to govern the enterprise will be essential to the JTB Enterprise as it continues to counter the dynamic threat by U.S. adversaries. This will become increasingly important as the United States withdraws forces from the Middle East, and the nature of counter IED work evolves in the future.

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